AMENDMENT TO THE SPECIFICATION

Kindly make the following amendments to the specification.

Please replace paragraph [0013] with the following paragraph, marked here to show the changes:

[0013] The invention will be better understood with reference to the drawings, in which:

Figure 1 is an exploded isometric drawing of a micro-pump according to an embodiment of the invention, wherein the micro-pump includes a top layer, an intermediate layer and a bottom layer;

Figure 2 is an isometric drawing showing an undersurface of the top layer in Figure 1;

Figures 3A-3E are drawings showing plan views of an annular recess surrounding a pedestal on the undersurface of the top layer in Figure 2, the annular recess and the pedestal are shown in different shapes;

Figure 4 is a sectioned drawing of a micro-pump similar to the micro-pump in Figure 1, showing the top layer snap-fitted to the bottom layer;

Figure 5A is a sectioned drawing of the micro-pump in Figure 1, taken along line ~~X-X~~ I---I in Figure 1, wherein the micro-pump is shown assembled and in a non-actuated state;

Figure 5B is a sectioned drawing similar to ~~Figure 3A~~ Figure 5A, wherein the micro-pump is shown in a first actuated state for drawing fluid through an inlet into a pumping chamber;

Figure 5C is a sectioned drawing similar to ~~Figure 3A~~ Figure 5A, wherein the micro-pump is shown in a second actuated state for expelling fluid out of the pumping chamber through an outlet;

Figure 6 is an experimental setup for evaluating the performance of a prototype micro-pump similar to that shown in Figure 1;

Figure 7 is a graph of flow rate against driving frequency of the prototype micro-pump obtained using the experimental setup in Figure 6;

Figure 8 is a graph of flow rate against pump head of the prototype micro-pump obtained using the experimental setup in Figure 6;

Figure 9 is a schematic diagram showing an application of the micropump in Figure 1;

Figure 10 is a sectioned drawing of a micro-pump according to another embodiment of the invention; ~~and~~

Figure 11 is a sectioned drawing similar to ~~Figure 3A~~ 5A showing a bimorph PZT cantilever disposed within the pumping chamber for actuating the micro-pump, and

Figure 12 is a sectional view of an alternative embodiment of the micro-pump in Figure 1, taken along line I---I in Figure 1, wherein the micro-pump is shown assembled and in a non-actuated state.

Please replace paragraph [0014] with the following paragraph, marked here to show the changes:

[0014] Figure 1 is an exploded isometric drawing of a micro-pump 2 according to an embodiment of the invention. The micro-pump 2 includes a first or top housing layer 4, a second or bottom housing layer 6 and a third intermediate flexible layer 8 sandwiched between the top layer 4 and the bottom layer 6 to define a three-layer structure having a total thickness or height of, for example, between 2-5 mm. Figure 2 is an isometric drawing showing an underside of the top housing layer 4. ~~At least one of the top layer 4 and the bottom layer 6 includes a pumping recess 10 that defines a pumping chamber 12 (Figure 4B) of the micro-pump 2.~~ At least one of the top layer 4 and the bottom layer 6 includes a pumping recess 10 that defines a pumping chamber 12 (Figure 5B) of the micro-pump 2. This pumping chamber 12 may have a height of, but not limited to, for example 200μm. The pumping chamber 12 may have a diameter of, but not limited to, for example 3-10 mm. In

the micro-pump 2 shown in Figure 1, the top layer 4 and the bottom layer 6 have respective pumping recesses 10. When disposed opposite each other, these pumping recesses 10 define the pumping chamber 12. The top layer 4 includes an inlet recess 14 and an inlet channel 16 that connects the inlet recess 14 to the pumping recess 10 to allow fluid communication therebetween. The inlet recess 14 may be, but not limited to, 0.5-2mm in diameter. The top layer 4 also includes an outlet channel 18 that is in fluid communication with the pumping recess 10. The outlet channel 18 includes a first annular recess 20 that surrounds a first pedestal 22 of the top layer 4. The bottom layer 6 includes an inlet 24 (Figure 5A) and an outlet 26 (Figure 5A). The inlet 24 of the bottom layer 6 includes a second annular recess 28 that surrounds a second pedestal 30 of the bottom layer 6. It should be noted that the shapes of the first and second annular recesses 20, 28 and the first and second pedestals 22, 30 are not restricted to a cylindrical shape as shown in Figures 1 and 2. Other shapes as shown in Figures 3A-3E are also possible. The outlet 26 includes a narrow portion 32 connected to a bulbous or wider outlet recess 34. The bottom layer 6 further includes a through-hole 36 that is in fluid communication with the pumping recess 10.

Please amend paragraph [0016] as shown in the following paragraph, marked here to show the changes:

[0016] (Currently amended) The intermediate flexible layer 8 includes an inlet hole 38 and an outlet hole 40 defined therethrough or positioned therein. The inlet hole 38 and outlet hole 40 may have a diameter of, but not limited to, between 0.05 mm to 0.5 mm. It should be noted that slits <u>such as 70 and 72 i (shown in Figure 12)</u> ~~(not shown)~~ instead of holes 38, 40 would also work. Such slits may have a dimension of 0.05-0.2 mm by 0.05-0.2 mm. The intermediate flexible layer 8 also includes an actuatable portion 42 (Figure 5A) that is clamped in place by a periphery of the top layer 4 and the bottom layer 6. When arranged or disposed between the top layer 4 and the bottom layer 6, the actuatable

portion 42 abuts the pumping chamber 12. In the case when both the top layer 4 and the bottom layer 6 include a pumping recess 10 each as described above, the actuatable portion 42 is arranged between the respective pumping recesses 10 of the top layer 4 and the bottom layer 6 to be in the middle of the pumping chamber 12 defined by the pumping recesses 10. The intermediate flexible layer 8 further includes a first valve portion 44 adjacent, in this particular embodiment surrounding, the inlet hole 38. When assembled between the top layer 4 and the bottom layer 6, this first valve portion 44 is disposed, with a slight bias, over the annular recess 28 with the inlet hole 38 seated on or abutting the second pedestal 30 to block fluid passage between the inlet 24 and the inlet recess 14. The second pedestal therefore function as a valve seat for the first valve portion 44 thereabove. The first valve portion 44 of the intermediate flexible layer 8 is moveable away from the annular recess 28 into the inlet recess 14 of the top layer 4 in response to a first actuation of the actuatable portion 42 to allow the inlet 24 to be in fluid communication with the inlet recess 14 through the inlet hole 38.

Please amend paragraph [0019] with the following paragraph, marked here to show the changes:

[0019] (Currently Amended) The intermediate flexible layer 8 may be made of silicon or a polymeric material, such as one selected from polycarbonate, polyacrylic, polyoxymethylen, polyamide, polybutylenterephthalat and polyphenylenether. Alternatively, the intermediate layer may also be a membrane layer, such as a polydimethylsiloxane (PDMS), ~~mylar~~ MYLAR®, polyurethane, polyvinylidene fluoride (PVDF), and flourosilicone membrane layer. If not commercially available, the membrane (or the intermediate layer, in general) can be made by any method known to those skilled in the art. Its manufacture is exemplified by the following process of fabricating a PDMS membrane layer. A PDMS membrane layer may be fabricated by casting. In order to facilitate the separation of cast

PDMS from a mold, an anti-sticking layer, such as a tridecafluoro-1,1,2,2-tretrahydroocty trichlorosilane layer available from Sigma-Aldrich Corporation, St. Louis, Missouri, U.S.A., is applied onto the surface of a mold cavity of the mold by a vacuum evaporation method prior to casting. The process is referred to herein as silanization.